

# AUTOMATION IN STEEL INDUSTRY

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In today's scenario Automation is a very important factor in almost all industries. The utility of automation is mainly of 2 types i.e. Drives (AC & DC) & PLC. The purpose of Drive Automation is for Energy Conservation, Speed Control & Torque Control, Process Control as well as Precision Quality control of Production. Our aim is to maintain the speed & torque irrespective of load variation. For this Thyristor control, IGBT Control Drives are incorporated. By varying the firing angle we are varying the speed as well as torque both.

### Various Plus Points of Automation :-

- Reducing of Hardware i.e.-Relays Logics
- Very First Fault Finding & Alarm Logging
- Easy Maintenance
- Addition or Subtraction of Systems are easy
- Efficiency Level is high
- Energy Conservation
- Preparation of MIS reports
- User Friendly
- First Scan Time
- Isolation of Supply



Basically in steel plants it is very much essential to control the speed of a motor by maintaining the torque as per load requirement. So Speed & Torque both are to be controlled. For this purpose we are using either VVVF Drive or DC Drive Control. But since DC motors require high maintenance and recurring cost hence AC motors with AC drives are getting popular.

In VVVF Drives 4 types of control methods are there.

Lets take Yaskawa Drive

1. V/F Control
2. Open Loop Vector Control
3. V/F Control with PG feedback
4. Closed loop / Flux Vector Control (with PG Feedback)

| New Equipped with 4 Control Modes  |   |   |   |
|--|---|---|---|
| <p><b>V/f control</b></p> <p>Drive for multiple motors</p> <p>A single inverter drives multiple motors</p> | <p><b>Open-loop vector control</b></p> <p>High-performance drive without speed detector</p> <p>No need of PG wiring</p> | <p><b>V/f control with PG feedback</b></p> <p>Accurate control on a line speed</p> <p>Speed control using the machine axis speed feedback</p> <p>PG speed control card (PG-A2 or PG-D2)</p> | <p><b>Flux vector control</b></p> <p>High-precision drive using PG feedback</p> <p>High-precision positioning, zero-speed control, and torque control</p> <p>PG speed control card (PG-B2 or PG-X2)</p> |

Many applications in Steel Industries like Blowers, Pumps, ID & FD Fans, Roller Table Drives, Cooling Tower Fans & Chiller Pumps, Torpedo Ladle Tilting Drive in Blast Furnace, Different applications in cranes (Main Hoist, LT & CT), Coiler & Decoiler in Wire rod mills, Electro Magnetic Stirrer in SMS, Compressors etc. are now being used with Variable Frequency AC Drives.

## Automation Types :-

### Level - 1 :

We are using one station. No networking. Control of Individual Machine.

### Level - 2 :

Networking possible using Profibus & Ethernet. Data logging, MMI, Analog I/O's. In one control room through communication plant operation can be taken place.

### Level - 3 :

Everything like Level-2, But MIS Reports, Data logging to users, Remote Operations. Ex- the Plant I/C can view all the operation parameter from his chamber. Multi Client Operation. Client Server Technology. Implementation of ERP is Possible. Production, Planning & Control all three are controlled by the package. Maintenance Modules, DATA/FAULT logging, Analysing of data's etc. Mainly it is a Total Integration Automation System.

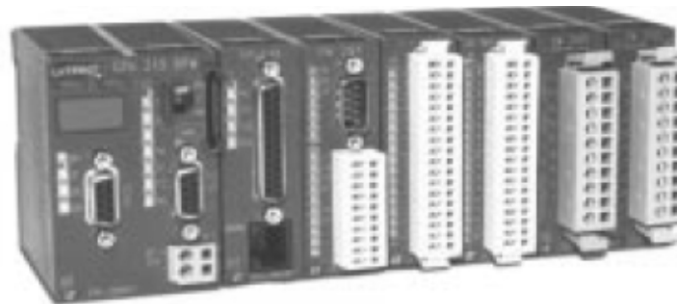
### Level - 4 :

Every thing like Level-3, But Satellite communication is possible. Through satellite you can control the equipment from a remote area.

The Automation Level-1 can be done by VVVF drive itself and for other levels we will use PLC- Programmable Logic Controller. PLC consists of:

- CPU- Central Process Unit.
- PII- Process Input Image
- PIQ- Process output Image.

First PLC will read the Field Inputs. Then it will create an Input image table. CPU will read the image table. As per the application program, it will write on the output image table. Then from the Output image table physical out put will be released. By the Output image table & physical output respective operation will take place.



For the whole above operation what much time takes place is called as one scan time.

According to scan time & distance of data transfer rate, Baud rate finalized & set on the communication setup. Data transfers in a package form.

